

Future shape

A mockup of the aerobrake, which is part of the Aeroassist Flight Experiment, was featured at this year's Engineering Exposition. Story on Page 3.



Mining helium-3

A train-like pressurized version of a lunar rover would carry workers, equipment and smaller vehicles for short excursions from the mining work-site. Story on Page 4.

Space News Roundup

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No. 44

Tests successful

Shuttles leak-free, DOD flight delayed

By James Hartsfield

Following a successful tanking test of *Columbia* Oct. 30, Space Shuttle Director Robert Crippen proclaimed NASA's shuttle fleet leak-free and ready to fly.

Crippen and other shuttle program managers also had set sometime between 5:30 p.m. and 9:30 p.m. Nov. 9 as the launch period and date for *Atlantis* on mission STS-38, a Department of Defense dedicated flight. But, on Oct. 31, the Air Force announced



an indefinite delay of the launch due to anomalies discovered during cargo testing. Officials said it was too early to predict a new launch date for *Atlantis*.

Since *Columbia* passed its test with flying colors, a new shuttle flight manifest and a target launch date for mission STS-35 are imminent, Crippen said.

"We put a team together, led by Bob Schwinghamer of the Marshall Space Flight Center and including representatives from all the centers and major contractors, and they worked the problem," Crippen said. "The results today prove that they did the job right. We ended up with a tight ship, and as far as we're concerned, *Columbia's* ready."

The highest concentration of hydrogen seen in the aft fuselage of *Columbia* during the test registered at 100 parts per million, well within the

500 parts per million concentration allowed for launch. *Columbia's* aft compartment was outfitted with 10 television cameras and 17 additional hydrogen sensors to search for leakage.

Columbia could be launched on mission STS-35 sometime in December, Crippen said, although an official date won't be set until a flight readiness review.

"I'm not ready to sign up to a date until I've seen a detailed examination of what we have left to do," he said. After instruments for the tanking test have been removed, *Columbia* will begin standard launch preparations.

"We'll look at the data review post-test as we do with all tests," KSC Launch Director Bob Sieck said. "But in real time, if there was a show-stopper, it would have been detected."

Meanwhile, a flight readiness test of the main engines on *Atlantis* at Pad 39-A was performed Oct. 31. Later in the week, technicians were expected to install ordnance devices and conduct tests of the engines' firing circuits.

In Bay 1 of the Orbiter Processing Facility, technicians this week drained residual propellants from *Discovery* and removed the orbiter's forward reaction control system. *Discovery* is now in processing for mission STS-39, a Department of Defense flight tentatively set for a Feb. 26, 1991, launch.



Don Clagg, a Bendix systems field engineer in Bldg. 9A/9B, points out the finer aspects of exercise on Space Station Freedom to Operation Desert Shield military support personnel. The United Service Organization (USO) and Community Support Operation Desert Shield, a civilian group in the Baytown-LaPorte area, have sponsored numerous activities, including JSC tours, for about 400 military support personnel temporarily stationed in the Houston area.

Budget plan quells furlough talk

After a month of continuing resolutions, Congress approved a budget plan for the 1991 fiscal year, putting discussion of federal employee furloughs almost to rest.

The budget plan must be approved by President George Bush before becoming final, but indications are that the president will sign the measure before the Nov. 5 deadline. Once signed, the danger of furlough will be past.

Earlier this year when FY90 was coming to a close with no FY91 budget agreement in sight, all federal

employees were informed of a possible sequestration of funds caused by the Gramm-Rudman-Hollings deficit reduction act. The result of the situation was the possible furlough of all federal employees.

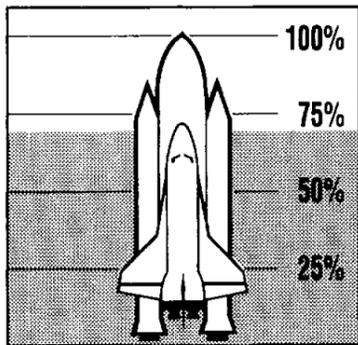
As members of Congress ironed out the budget wrinkles, they passed a series of continuing resolutions to keep the government operating. Meanwhile, civil servants waited for a definitive word on the furlough planning.

However, passage of the projected \$1.236 trillion federal budget plan

resolved the issue late Saturday night. There will be no budget-related employee furlough in FY91 if Bush signs the plan.

NASA's portion of the federal budget totals about \$13.9 billion for the next year and includes \$1.9 billion for the Space Station Freedom program.

The space station line item is a slight increase from last year's \$1.8 billion, but is significantly lower than the \$2.4 billion requested by President George Bush. The \$1.9 billion is midway between the House and Senate version of the money bill.



1990 GOAL: \$350,000



Overcoming challenges common thread for NASA of yesterday, NASA of today

By Kari Fluegel

The only difference between the NASA of today and the NASA of yesterday is today's team was trained on computers, not slide rules, JSC Director Aaron Cohen said in Oct. 30's keynote address at Space Exploration '90.

NASA Administrator Richard Truly was scheduled to deliver the address at the aerospace industry exposition sponsored by the NASA Alumni League. However, Truly was unable to attend, and the address was presented by Cohen.

"As the NASA of old, the NASA of today is overcoming current challenges and will leave a record of

accomplishments that will astonish and challenge the next generation of space explorers," Cohen said.

The people on the team are the key to NASA's success, he said.

"NASA is not just another federal agency, it is a family of people who are committed to reaching for the stars, people who are committed to improving the quality of life for all mankind, people with diverse skills and backgrounds who are willing to work long hours at reduced wages because they are committed to NASA, its goals, objectives and missions," Cohen said.

Quality and excellence also are keys to the satisfaction of NASA

customers—the American public, Congress and the president.

"Quality was job one at NASA long before it was job one anywhere else, and NASA's long list of accomplishments prove that it is still that way," Cohen said. "I must say, however, that yesterday's standards are not good enough for tomorrow's NASA. If we are to build and operate a space station, push the edge of astronautics, monitor the phenomena of our Earth's systems, and transport men and women through our solar system, we must expect more from ourselves."

Cohen also said stable funding, schedules, goals and people is critical to any smooth operation. He added

the recent budget debates in Washington were tough for Congress and for NASA.

"I must be honest and admit that I had hoped to do better... but at I time when the Congress was holding most programs to the FY90 levels, NASA did get a 13.6 percent increase," he said. "For that I am thankful. But it is not enough to support all of our ongoing activities or to turn the President's moon/Mars program into a reality."

"If the space program that has been laid out by the president and approved by the Congress is to be implemented, NASA must be able to obtain stable predictable levels of funding," he said.

At the precipice, ex-smoker faces his moment of truth

By Brian Welch

The moment of truth came last Friday night when I stood before the cashier at a certain Bay Area emporium, clutching a bottle of 12-year-old liniment to my wracked and wretched frame, and there I lingered for an eternity of seconds at the very precipice of failure, mentally rehearsing how I'd request a pack of cigarettes.

It had been a long and trying day, perhaps the toughest yet in my abstinence from cigarettes, and the Big Red gum I had been chewing compulsively for four hellish days just wasn't gettin' it any more. Somewhere deep inside, sometime earlier in the day, a tiny little fissure had broken through my wall of resolve.

By the end of the day, with new pressures to produce new things—and no cigarettes to "help" me get those things done (or to do them as well as I fancied I might if I still smoked)—the fissure had grown to a large crack and then to a mighty breach, and before long a torrent of rationalization was flowing through like the Niagra and carrying me along.

You non-smokers out there should know and understand that nicotine works its wiles on the mind as well as the body, and it does not take very long at all for the mind to become a willing and willful partner. This is an insidious business. You smokers out there know exactly what I am talking about if ever you've tried to quit.

And so by Friday evening, not long after sundown, I was ready to chew the carpet and howl at the Moon, literally, and I found myself at the brink,



clutching a bottle and gumming the words that I thought would set me free.

And that is precisely the moment at which my new hero Dan Remington of the Legal Office, bounded

through the door, caught my eye and said, "Hey Brian, I sure did enjoy your column in the Roundup today. How are you doing?"

I stood a little taller and a little straighter in those seconds, and suddenly the torrent stopped. I smiled and thanked Dan for his kind words, and gingerly backed away from the precipice. Of course, a large piece of me wanted to smack him for having the temerity to appear at that place at that time, but the urge lasted only for a fleeting moment. After all, when the Universe arrays itself on your side, even to the extent of providing government lawyers who suddenly appear to keep you from buying a pack of smokes, it is time to pay

attention and do the right thing.

I have not been that seriously tempted to smoke since, and it's now been 8 days, 13 hours and 3 minutes since my last cigarette. Thanks Dan, I owe you one.

Meanwhile, my compadres in JSC's smoking cessation class have been enduring various shades of success, but mostly the numbers are quite good. We began with 28 people in the Tuesday afternoon class; we are now down to between 20 and 25. Of that number, nine have not smoked since Quit Day on Oct. 23. Four people have had only one cigarette in that time, and three people have had from two to five

Please see **SMOKE**, Page 4

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.

General Cinema (valid for one year): \$3.75 each.
 AMC Theater (valid until May 1991): \$3.50 each.
 Sea World (San Antonio, year long): adults, \$17.25, (2-day \$21.95); children (age 3-11) \$14.75, (2-day \$18.95).
 Texas Renaissance Festival (Saturdays and Sundays, Oct. 6-Nov. 18): child, \$4.95; adult, \$8.95.
 Dickens on the Strand: (Dec. 1-2, Galveston): child (6-12), \$2, adult, \$4, seniors, \$2. Tickets go on sale Nov. 1).
 Delta Downs Trip: (Nov. 17-includes transportation and admission to clubhouse): \$15.00.
 Delta Downs Overnight Trip: (Nov. 17-18-includes transportation, accommodations at the Holiday Inn, admission to clubhouse, and buffet breakfast): \$55.00.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must sign up in person at the Gilruth Recreation Center. Everyone will be required to show a badge or EAA membership card. Payment must be made in full when you sign-up. Classes tend to fill up about five weeks in advance.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30 p.m.-9:00 p.m. Monday-Friday.

Defensive driving—Course offered from 8 a.m.-5 p.m. Dec. 15. Cost is \$15.

Weight safety—Required to use the Gilruth weight room. The next class is on Nov. 14 or Nov. 29. Cost is \$4.

Aerobics and exercise—Both are ongoing classes.

Country & western dance lessons—There are still openings in the intermediate class that begins Nov. 5. Sign-ups for the beginning and intermediate class that will start Jan. 7 are being taken now.

Health related fitness program—Includes screening by medical examination and a 12-week education section. Exercise programs are individually prescribed from fitness assessments. For more information call the Physical Fitness Office at 483-0301 or 483-0302.

New way to start your day!
 The JSC Employee Information Service now is updating its reports at 8:30 every morning. The recorded announcement can be reached by calling:
483-6765

JSC

Swap Shop

Property
 Sale: 6 acres, fen. w/pond, 18x80 Redman mobile home, 3 yrs. old, shop 14x16, 8 mi. east of Crockett on Hwy. 21 and Country Rd. \$32,500. 485-4592.
 Sale: Dickinson, 2 acres, Humble Camp Rd., improved, util. avail., \$12,500/acre. Texas City, 2-1-1, den, DR, encl. back porch, \$32,500. Shelly, 333-7153.
 Sale: Florida 5-3-2 on 2.5 acres, FPL, near KSC, zoned for horses. \$139K. 538-2299.
 Sale: Dickinson, 8% VA assum, 3-2-5-3, lg. lot, all formals, CA/H, stained glass wndws, FPL, 15 min. to NASA. x36869 or 534-3554.
 Sale: Galv. duplex investment property, 3 bks. from Guido's, renting for \$700/mo., \$48K, possible owner fin., ex. cond. x36869 or 534-3554.
 Sale: Friendswood, Mustang Meadows, 2.03 acres. 481-4187.
 Lease: Heritage Pk, 3-2-2, FPL, formal DR, breakfast area, fan, fen., no pets, \$725/mo. 482-6609.
 Sale: Corner lot, Lake Livingston, 60x115, util. avail., country club w/golf, pools, \$9,500, OBO, x30032 or x31834.
 Lease: Galv. Bay w/frnt, 2-2, block paneling, wood floors, decked 3 sides, fen., bulkheaded, hot tub, Gazebo, \$1,200/mo. 333-6277 or 339-3562.
 Sale: Hot Spring Village Ark., wooded lot, util. improvements, \$13K, OBO. 333-6150 or 326-1254.
 Sale: Kerville, 12x60 mobile home, furn., good cond., lg. CP, lg. cov. patio, \$7,500. 333-6150 or 326-1254.
 Sale: Sterling Knoll, 3-2-2, pool, FPL, fans, 1,450 sq. ft., appli., gar. door opener, playground, \$75K nego. Terry, x33814 or 486-5126.
 Rent: 3-1-1 Scarsdale, remodel., new carpet/paint, \$450/mo. 484-4944.
 Sale: 3-2-2 on 1 acre in Alvin, 30x20 CP, 600 sq. ft. screened in patio, \$70K. 331-4260.
 Lease: 3-2-2, Wedgewood Village, 1,650 sq. ft., new carpet/paint, cul-de-sac. 482-6744.
 Sale: Bay Glen Manor, 3-2-2, FPL, wet bar, fans, whirlpool tub, garden bath, custom shades, prof. maid serv., lawn care, \$120K. 484-1441.
 Sale: Seabrook townhouse, 3-2-5-2C, fen. in patio, spacious, \$22K cash. 333-7345 or 474-2339.
 Sale: 60 acres, 3 mi. from Karnes City, 50 mi. from San Antonio. 783-9164.
 Sale: Limestone County, 40 acre pastureland on paved road, fen., ponds, barn, corral, catch pen, 2-2 mobile home, self by owner, \$68K. 479-3965.
 Sale: 4-2-5-2, Camino So., new carpet, backs up to Golf Course. 480-4502.
 Rent: Lake Livingston w/frnt. home, 3-2, CA/H, furn. cov. decks, pier, new cond., w/wknd rates. 482-1582.
 Lease: Sageglen, 4-2-2, formal LR/DR, new carpet/paint/vinyl floor in kitchen/breakfast/bath. K.M., 282-3229 or 484-1119.
 Rent: 1 wk. (Sat. to Sat.) Pagosa Springs, CO, 2-2 house, sleeps 8, Jacuzzi, loaded, \$580. Scott, x34614 or 334-2278.
 Rent/Lease: 3-2-2, formal LR/DR, den, FPL, new carpet, Shady River Subdiv., \$750/mo. plus dep. 280-2307 or 471-0150.
 Rent: Galv. condo, Seawall & 61st, sleeps 6, furn., dly. wkly/wknd rates. x33479 or 486-0788.

Cars & Trucks
 '74 Chevy Nova, 350 cu. in. V8, 4-dr., \$600, OBO. Manuel, x38326.
 '86 Honda CRX, 40K mi., ex. cond., \$5,400, OBO. 480-1646.
 '82 Mazda RX-7, needs muffler and bat, \$1,500. x31226 or 534-3710.
 '64 Mercedes Benz 190C, European model, \$2,900. 480-3908.
 '52 Willis Jeep, \$1,950. x30333 or 471-2885.
 F-150 PU, sport wheels, V8, 22K mi., good cond. 480-1846.
 '67 Mustang Fastback, reb. 289 HO eng., \$4K. Jim, 286-1934.
 '83 Plymouth Reliant, 4-dr., \$940. x34339 or 481-1439.
 '87 Pontiac Grand Am, auto., 4-dr., low mi., \$6,150. x36588 or 358-9598.
 '89 Olds Calais S, 2-dr., 5-spd., Quad 4 eng., FE3 suspension pkg., warr., \$9K. 470-8759.
 '87 Honda Civic, ex. cond., auto., \$6K. Sheryl, 333-4743 or 996-6438.
 '78 Honda Accord, sunroof, 3-dr., 5-spd., AM/FM, new mt., AC, \$1,400, OBO. 940-5005.
 '77 Grand Prix, less than 100K mi., new trans./tires/radiator, runs great, \$1,500, OBO. David, 282-3827 or 554-5514.

Boats & Planes
 '19 Lonestar w/cabin, 2 40hp Evin. Sportsman trlr., \$1,500. x31226 or 534-3710.
 '87 18' Celebrity Bowrider, 165hp I/O, galv. trlr., new spare, stainless prop. cov., top, ex. cond., \$9K, OBO. 286-3626.
 '9 Coleman bass boat w/14' trlr., ex. cond., \$4,500, OBO. Joe, x33190 or 482-3069.
 '83 27' Chapparral w/trlr., full head/galley, AC, new VHF/DF/Loran, sleeps 6, BV \$23K, OBO. x31833 or 534-6073.
 Aircraft propeller, Sensenich 74DFM6-0-58, fits some Beech, Piper PA-18, PA-22, PA-28 series aircraft, \$900. 538-2299.
 '64 24' Lone Star cabin cruiser w/76 135hp Johnson OB on dbl. axle trlr., \$5,500. Ronnie, x31851 or 332-7501.
 Mistral competition windsurfer w/6.2 m sail, \$500. Mike, 283-5890 or 280-9005.
 '16' Hobie Cat, \$600. Bill Huber, x30039 or 554-2992.

Audiovisual & Computers
 TI-994A computer w/assorted SW and access, \$150. Ed, x36969 or 332-0442.
 Wyse 50 terminal, printer, S-100 computer, 2 drives w/CP/M & Z3CPR OS, WordStar, CalcStar, Turbo-Pascal, manuals & documentation, BO all or part. Keith, x38952 or 486-5072.
 IBM PC SW, Kings Quest, Barbarian, Balance of Power,

JSC

Dates & Data

Today
Cafeteria menu — Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

Monday
Cafeteria menu — Special: hamburger steak. Entrees: beef Burgundy over noodles, fried chicken. Soup: cream of chicken. Vegetables: buttered corn, carrots, green beans.

Tuesday
Ada users' symposium — The third annual NASA Ada Users' Symposium will be Nov. 6 and is hosted by JSC and the MITRE Corp. For more information contact John Cobarruvias, x39357, or Sheila, 333-0910.
ASQC meets — The American Society for Quality Control will meet at 5 p.m. Nov. 6 at the American Host Inn. Steven Davis will speak on "Quality Management in the World of High Tech Medical Manufacturing." For more information contact Ray Swindle at 280-2797.
Black History Program Committee — The JSC committee will meet at 11:30 a.m. Nov. 6 in Bldg. 45, room 751. All interested civil servant and contractor employees are encouraged to attend. Candidates for the Steering Committee and working group committees will be selected, and ideas and tasks for next year's event will be discussed. For more information contact S. Robinson at x31444.
Cafeteria menu — Special: turkey and dressing. Entrees: baked meatloaf, liver and onions, barbecue spare ribs. Soup: beef noodles. Vegetables: Spanish rice, broccoli, buttered squash.

Wednesday
IEEE video conference — An IEEE Galveston Bay Section Video Confer-

ence will be at 10:30 a.m. Nov. 7 in the Gilruth Center. Registration deadline is Nov. 2. For more information, call Andy Lindberg, x31474
Astronomy seminar — The JSC Astronomy Seminar will be at noon Nov. 7 in Bldg. 31, room 129. Dr. Al Jackson will report on the Division of Planetary Science Meeting. For more information contact Jackson at 333-7679.
RICIS symposium — JSC, the Research Institute for Computing and Information Systems, and the Software Engineering Professional Education Center will host Software Engineering '90 Nov. 7-8 at the Holiday Inn on NASA Road 1. Registration begins at 8 a.m. Nov. 7, and the final session concludes at 5 p.m. Nov. 8. David Weiss of the Software Productivity Consortium, will speak on "Synthesis: Integrating Product and Process" at 1:45 p.m. Nov. 7. A tutorial series will be offered in conjunction with the symposium. Symposium or tutorial registration is \$125 for government personnel, \$150 for contractors and \$60 for students. For more information, contact Jane Kremer, x32601, or SEPEC, 282-2223.
AIAA meeting — The American Institute of Aeronautics and Astronautics will hold its section meeting at 5:30 p.m. Nov. 7, at the Gilruth Center. The presenter will be Donald K. "Deke" Slayton, president and vice chairman of Space Services Incorporated of America. Members and spouses \$8, nonmembers \$9, students and young members \$7. The dinner deadline is noon Nov. 2 and cancellations are required prior to deadline. For more information contact Frankie at 333-6064 or Sandy at 845-0735.
Cafeteria menu — Special: Spanish macaroni. Entrees: broiled fish, tamales with chili. Soup: seafood gumbo. Vege-

tables: ranch beans, beets, parsley potatoes.
Thursday
NPMA dinner meeting — The JSC's National Property Management Association monthly dinner meeting will be held at 5 p.m. Nov. 8 at the Gilruth Center. The guest speaker will be from NASA's Procurement Office. For more information contact Sandra Pierce at 282-4151.
Cafeteria menu — Special: chicken fried steak. Entrees: beef pot roast, shrimp chop suey, pork chops. Soup: navy bean soup. Vegetables: carrots, cabbage, green beans.
Nov. 13
SEPEC seminar — The Software Engineer Profession Education Center will present an "Overview of Real-Time Simulation" seminar at 8:30 a.m. Nov. 13 at the University of Houston-Clear Lake, Bayou Bldg., room 1-311. The registration fee is \$35 per person per session. For more information contact SEPEC, 282-2223.
Nov. 14
NCMA banquet — The National Contract Management Association Houston Chapter will host its 23rd annual Educational Conference Nov. 14. The conference will include a Nov. 14 banquet featuring Harold Stall, JSC director of Public Affairs, at the Nassau Bay Hilton. A workshop will be held Nov. 15 at the Hobby Holiday Inn. Registration is \$100 for members; \$125 for nonmembers; and \$25 for the banquet only. Call Sue Garman, x35998, or Linda Frazier, 333-6389 for more information.
Astronomy seminar — The JSC Astronomy seminar will be held at noon Nov. 14 in Bldg 31, Rm. 129. Paul Maley will speak on the Mexico Solar Total Eclipse, July 1991. For more information contact Al Jackson at 333-7679.

Pinball Wizard, Space Quest, Starflight. 280-2802.
 12" monochrome Samsung PC monitor, \$50; Sanyo turntable, \$25, wood flip-top 2 drwr. desk, \$35; sec. chair, \$5. 554-5522
 2 TI 99/4A computers, P-Box w/floppy disk drive, RS232 I/F, speech synthesizer, RF modulator, TI controller, SW, diskettes, \$260. 488-0156.
 IBM compat. laptop, backlit screen, 2 3.5" floppy drives, 1200 baud modem, mouse, SW, \$800. Mary Lou, x34306 or 480-2206.
 AT&T 6300 personal computer, 640K CPU, 8087 coprocessor, 2 360K drives, \$500. 488-0189.
 Intel 386 inboard PC, installs in your 8088 IBM, IBM XT, Compaq, or Radio Shack computer, Norton SI 16 plus speed, 2 yr. warr., \$375. x30092 or 481-3637.
 IBM XT computer, 640K mem., 30 MB HD, 2 floppies, AST 6-pak loaded mem., clock, ports, Taxan color hi-res monitor, \$1,275 or trade for car or Mac SE computer. x30092 or 481-3637.
 Cerwin-Vega HED-15 speakers, \$250/pr. phase linear 400 pwr amp, \$350. Frank, x33573 or 480-9376.
 Laser 128 EX, Apple IIe, ILC compt, 128K RAM, built-in parallel and serial ports, \$150. x30521 or 992-3916.

Musical Instruments
 Korg Poly 800 digital program synthesizer, \$350, OBO, Yamaha RX 21 digital program drum mach., \$250, OBO. Jim, x30742 or 484-7721.
 Fencer Mustang 6-string elec. guitar w/hard wood case, new strings, \$175. Rafe, 283-5638 or 996-9701.

Lost & Found
 Found: Pr. of bifocal glasses in parking lot of Bldg. 45, call to identify. 474-4006.
 Lost Ray Bon sunglasses on 10-18 after 7:30 p.m. on field 3 at Gilruth Rec. Center, blue lenses w/pink strap, reward. Paul, x35462 or 334-3104.

Pets & Livestock
 AKC male tricolored Beagle, 1 1/2 yr. old, outside dog, needs home w/children, \$200. Norma, x33925 or 538-2011.
 Baby cockatiels, hand fed, Linda. 484-7834.
 Blik-tan Dachshund, AKC, born 7-30-90, male, \$175. Jeane, 488-3235.
 Rabbits, minipops, New Zealand. Gallo. 554-6200.
 Exotic Australian Shepherd, \$250/ea.; exotic finches, ring neck doves, guinea pigs, \$5/ea. 482-6744.
 Exotic min. Vietnamese pot bellied pigs w/reg. papers, white markings, \$350/ea. 482-6744 or (409) 778-6976.
 Free fem. blk. pups, mother is reg. Golden Retriever. Scott, x35343.
 Arabian Weanling colt; 13 yr. old 7/8 Arabian mare, BO. 473-4433.
 Dashshund pups, 3 males, AKC, min. shots, wormed, born 9-13-90, avail. 11-16-90, \$150. Michael, x34158 or 480-2152.
 Beagle, tri-colored fem., 6 mos. AKC reg., \$150. Leonard, x37587 or 481-8852.
 AKC Pedigree Dalmatian pup, 8 mos. old, all shots, \$150. Jim, x30742 or 484-7721.

Personal
 Will the person who bought a Marklin train from me sev. mos. ago call for your controller. Samouce, x35053 or 482-0702.
 Will the Brenda I bought my Siamese kitten from please call me. Martha, 473-4433.
 I would like to take the time to say a belated thank you to all of the people who donated leave hours to me while I was in the donated leave program so that I could have my son. He is now 15 months old. It was great to spend this time with him. I couldn't have been off had it not been for this. Connie Hutchinson, 483-4386.

Household
 St-gz waterbed, full wave, 1/2 current price, 2 yrs old, stained wood with simple bookcase headboard, \$150 OBO. Greg 929-7348 or 488-2082.
 Kreg 2-7-348, bookcase headboard, drawer unit, pads, heater, liner, mattress, and linens, \$200; mahogany dbl dresser, \$150. Tom, 244-9855 or 996-0574.
 Drape/ies, pink, \$40. Samouce, x35053 or 482-0702.
 Glass DR table, 4 chairs, \$100; sofa, floral, ex. cond., \$150. 482-9115.
 Antiques davenport table, walnut, ex. cond., \$55. 479-1004.
 Sofa, loveseat, coffee table, 2 end tables, 2 lamps, good cond., \$230, OBO. Jim, 282-3732 or 996-0319.
 Amana microwave, needs repair, glass top leather sided

coffee table, \$100/ea. OBO. 482-6744.
 Sofa/bed, queen sz. Stearns & Foster, forest green w/ rust & camel tones, ex. cond., 8 mos. old. \$600, OBO. Cindy, x38801.
 G.E. washer, elec. dryer, ex. cond., \$200/both. Keith, x35191 or 480-8449.
 Full sz. matt./box spring, \$75, OBO. x38896 or 482-9447.
 Rattan loveseat, swivel chair, footstools, glass top end tables, blue/rose, \$230, OBO. Linda, x36881 or 486-5246.
 Queen sz. wtrbd., matt., liner, htr., wtr. treatment, etc., \$50. Dennis, x34405 or 480-5076.
 DR table/chairs/buffet, 36x48 w/o leaves, 3 leaves at 8", dk. wood, antique style, needs some work, \$150, OBO; white French Prov. corner desk, \$40, OBO; china, 51-pc., April Showers by Castlecock, ex. cond., serv. for 7 plus serv. pcs., \$155, OBO. 944-3380.

Wanted
 Want carpool participants from Abel/Memorial area. Barry Halpern, 333-9502.
 Want normal cap elec. dryer, working or not, will pay up to \$50 if working. x31363 or 479-5594.
 Want working 60 gal. 2-stage elec. air comp. Scott, 283-5645.
 Want good cond. sewing cab. and hanging bird cage. Rebecca, x37441 or 332-7217.
 Want occasional, resp. teenager or older babysitter for 4 1/2 yr. old girl in our Webs. home, ref., will pay competitive rates. 332-0442.
 Resp. 25 yr. old divorced male would like to rent sm. 1 or 2 BR home/duplex/gr. apt. in LC, Pearland or somewhere near JSC with low rent beginning in Dec. 470-8759.
 Want child care for 1 yr. old in Friendswood or CL area, prefer limit of 3 children. Debbie, x33846.
 Want roommate to share lg. new house, 10 min. from JSC, non-smoker, no pets please, \$325/mo. plus 1/3 util. Carol, 335-8521 or 474-5106.
 Want 75-80 Ford Pinto, auto., no PS, no AC, no PB, body not important, does not need to run, must be towable. Trey, 280-4275 or 484-7834.
 Want carpool from Pasadena, Village Grove area to JSC, hrs. 7:30-4:30. Helen, x37195.
 Want Beta VCR tape rewinder. George, x30749.
 Want roommate to share lg. new house, 10 min. to JSC, \$325/mo. plus 1/3 util., no smokers or pets. Carol, 474-5106.
 Want sz. 9 maternity clothes for work, cheap. Kim, 283-5703 or 559-2764.
 Want riders for vanpool starting from SE side and Braeswood, 610 locations to CL/JSC. Chau, x31451.
 Want fem. non-smoking roommate to share lg. 3-2-5-2 home in CLC. \$330/mo. plus 1/2 util. Linda, x36881 or 486-5246.

Miscellaneous
 '75 Honda 550cc, \$550; Scuba BC, \$45/\$65/\$75; spare air, \$150; Spear gun, \$85 & \$110. x30686 or 480-3260.
 Sears Craftsman riding lawnmower, 11 HP, \$495; Roper 4 HP high wheel pushmower, 22-inch cut, \$95; Zenith Chromacolor 19-inch TV, \$75. 482-8827.
 El Cheapo polyester sportcoat, 42-44 long, blue, good cond., \$25. Greg, 929-7348 or 488-2082.
 Fiberglass camper for short bed, \$175; VCR VHS carrier, \$75. x36514.
 Captain's bed, \$175; day bed, \$350; refrig., \$150; gas stove, \$275; kg-sz bedroom set, \$150; book shelves, 4x8 sz (large); 4 chairs w/glass table patio set, \$150; misc. items. Ms. Hollie, x53846 or 481-3573.
 Antique 8-leg walnut drop-leaf table w/2 extra leaves, ex. cond., \$395; small old walnut liquor cabinet, \$50; 2 sets custom drapes, large enough for 2 patio doors, \$100; lamp table, \$15; typing table, \$10; several pieces of old costume jewelry, man's watch chain. 488-5564.
 Bow and arrow set, 15-lb pull w/five Bear arrows, \$20. Aaron Brown, 944-0493.
 Medical equipment: wheelchair, \$100; Jobst extremity pump, \$100; both in ex. cond. Earl Rubenstein, x34807 or 532-2242.
 3 five-gal. cans of off-white/beige interior paint, \$20 ea. or \$50 all. 339-1337.
 Very nice crib, \$60; walker, jumping chair, swing, etc. 337-3122.
 Elec. heater, \$10; 2 Daisy pump air rifles, \$15 ea. Joe, x33190 or 482-3069.
 Antiques and collectibles, clocks, lamps, glassware, furniture, nautical, tools, wash stand set and more. 538-2028 or 332-4382.
 65-gal saltwater aquarium, \$450; motorized treadmill,

\$250; ping pong table, \$50; Shopsmith Mark IV w accessories, \$2,200; Sears radial arm saw, \$175. Dale, x39441 or 470-9738.
 Golf clubs, Tour Model III 1-SW, \$16.95/club; metal woods, 1,3, or 5 wood, \$25/club. David, 554-5514.
 1.73 carat eng. ring w/matching diamond wedding band w/p. \$2,500 8x4 3/4 in. pool table, good cond., \$550.
 Desk, 48"x28", 6 dwr, all wood, good cond., \$95; full sz Sealy box spring/matt., \$85. Ted, x36894 or 280-9595.
 Upholstered bar stools, 2 30" high, 1 24" high; sofa; office style end tables and chair. Tom, x31418 or 863-7561.
 RCA stereo console TV, pecan finish, was \$850 now \$400; Sears exerciser/rower, \$125; steel storage cabinet, \$75; old cast iron grill, round, not barrel type, w/stand, \$50; Sanders Man's western boots, sz 10, \$65. Diane, 283-5618.
 55-gal fish tank, wooden stand w/bookshelf underneath, under-gravel filter, misc. decor, \$200. Bob, 471-6189.
 Brown plaid hide-a-bed, \$75. 3 boxes (65-75) romance books, \$10+box; video cabinet, still in box. \$80. Sandi, x33854.
 Wilson staff irons, 2-PW, good cond., \$175. Terrence, x36435 or 480-6989.
 Sears exercycle, \$75; small trampoline, \$15; 2 fruitwood French Provincial end tables, \$75 ea.; antique oak glass china cabinet, \$350; Durrine reversible wool rug, approx. 10' x 10', \$450. 488-6232.
 Golf clubs, jr. sz., ages 9-15, 3 irons, 1 wood, putter and bag, \$50. 283-5465 or 332-1725.
 2 hives of bees and all supplies necessary for extracting honey, including stainless steel extractor, also 15 hve bodies, 2 suits and more. \$300. 482-7873.
 Rowing machine, ex. cond., \$70. Tony, x34415 or 480-2206.
 Diamond dinner ring, white gold, 2 1/2 carats; lady's diamond dinner ring, cluster style, 2 1/2 carat. (409) 925-1468.
 357 S&W stainless, 6" barrel, \$325; bike rack, \$15; Shoei MC helmet, \$35; phone redial, \$15; Aquatonic Restonic kg-sz waterbed w/lumbar unit and 10 tubes, \$500; Realistic 40-channel CB w/antenna, \$40; GE stereo cass. player Walkman, \$25. Terry, x33814 or 486-5126.
 Gray bra and dash cover for '88 Toyota Camry, both almost new, \$50 for both or \$40 for bra, \$20 for dash cover. 282-2872 or 996-7697.
 Hitachi professional drywall screwdriver, rated 4.2A, new, \$50. Howard, x37336.
 Deluxe Westcoast mirrors, new, \$60; Alpha 215 sailboard complete, \$300; pay phone, \$50; shotgun loader w/ accessories, \$100; lg pedstal shop fan, \$75. 474-5558.
 Sturdy, insulated igloo dog house, \$30; queen-sz waterbed, \$15. Pete, x30768.
 Patrick Nagel commemorative prints #5 through #15, from \$200. Mike, 283-5890 or 280-9005.
 Rollins burglar alarm w/infrared motion detector, 2 remote controls, window & glass door units, connects to fire alarm & police, \$1,000 negot. x38662 or (409) 737-3591.
 Bandeau belts, solids, prints, twists design, \$7.50-\$15; original unique design denim jackets, M-L. x31653 or 326-4030.
 Weight bench w/leg attachment and adjustable incline, \$60 OBO; custom speaker boxes w/3-way 150 watt Kenwood speakers, \$45; 7x7" tent, \$20; Royce 40-channel CB radio and antenna, \$20. Keith, x35191 or 480-8449.
 1847 Wm Rogers new silverplate service for 8 w/7 extra service pieces, all wooden case, 783-9164.
 BIC sport-rack car racks for mid-size car, \$40. Raul, x30107.
 Hospital bed, manual, \$700 OBO. 992-2309.
 Wood: 2x4's, 25c ea.; 1x6's, 25c ea. 1x8's, \$1.00 ea.; misc. 2x6's through 3x8's, \$5.00-\$15.00 ea. 339-1337.
 Large solid oak dinner table w/pedestal and eight chairs, all heavy unfinished oak, \$195; large solid wood desk w/ glass top, military surplus w/brown paint, \$30. Jeff, x31974 or 286-1935.
 Keystone classic 15-in. mag wheels, ex. cond., \$100; stock distributor and cap for Chevy small block, good cond., \$25. Jeff, x31974 or 286-1935.
 Briggs & Stratton lawnmower, \$90; yellow rocker, \$25; sewing machine, \$50; all prices nego. 332-7629.
 Hoover Decade 80 vacuum, good cond., \$60; Hotpoint microwave, \$50. Stratis, x30521 or 992-3916.
 Coleman utility trlr, 4x5 bed, cover, \$250. 538-1051.
 Capella stroller, built sturdy, ex. cond., \$65. 487-8246.
 Houdini playpen, \$35; Gerry bat-pwd baby swing and cradle, \$75; Jenny Lind hanging table, \$20; weight bench w/extra weights, \$90; comfy armchair, \$20. 283-5407 or 332-4809.

Shaped for the future

Experiment to test aerobrake concept

By Pam Alloway

A mockup of an aerobrake structure garnered its share of looks at this past week's Engineering Exposition.

But then the structure, part of the Aeroassist Flight Experiment, is known for its looks, specifically its odd oblong-helmet shape that will enable it to plunge into the upper reaches of the Earth's atmosphere, ricochet back toward space after decelerating through the use of its aerodynamic drag, and finally enter low Earth orbit for a space shuttle to retrieve.

The purpose of the AFE is to investigate environmental and critical vehicle design technologies that could be applied to the design of an Aeroassist Space Transfer Vehicle. Investigators believe the use of aerobraking on return planetary trips would enable such vehicles to transport twice as much payload to the spacecraft's destination. The spacecraft would be used to transport science payloads or cargo, servicing equipment, and eventually personnel between low- and high-Earth orbit, a return from the Moon, and Martian entry and return.

JSC currently has a full scale mockup of the aerobrake structure that is constructed of wood, plastic and foam. The mockup, which was parked at Gilruth earlier this week for the Engineering Expo, was built so engineers could study tile patterns and installation.

A full scale structural model is housed in Bldg. 10 and was built for certification testing. Assembly on the flight model is expected to start mid 1991, said Dr. Don Curry, AFE project area manager at JSC.

Aeroassist is a generic term encompassing various aerodynamic maneuvers in which a vehicle enters and exits the atmosphere to achieve braking without making a complete entry. The AFE is needed to provide design environments that cannot be simulated on the ground.

The actual flight scenario would involve a shuttle crew, using the shuttle's remote manipulator arm,

setting the spacecraft adrift in a 184-mile-high orbit. After the shuttle is safely away, a three-foot-long solid rocket motor with 27,000 pounds of thrust will fire for 116 seconds and separate from the vehicle just before the spacecraft enters the atmosphere at an altitude of 400,000 feet or about 75.8 miles.

During the 10-minute "aeropass" the spacecraft would dip to 250,000 feet or 47.3 miles and begin a gradual climb back toward space. The spacecraft will be designed to withstand temperatures up to 2,700 degrees Fahrenheit.

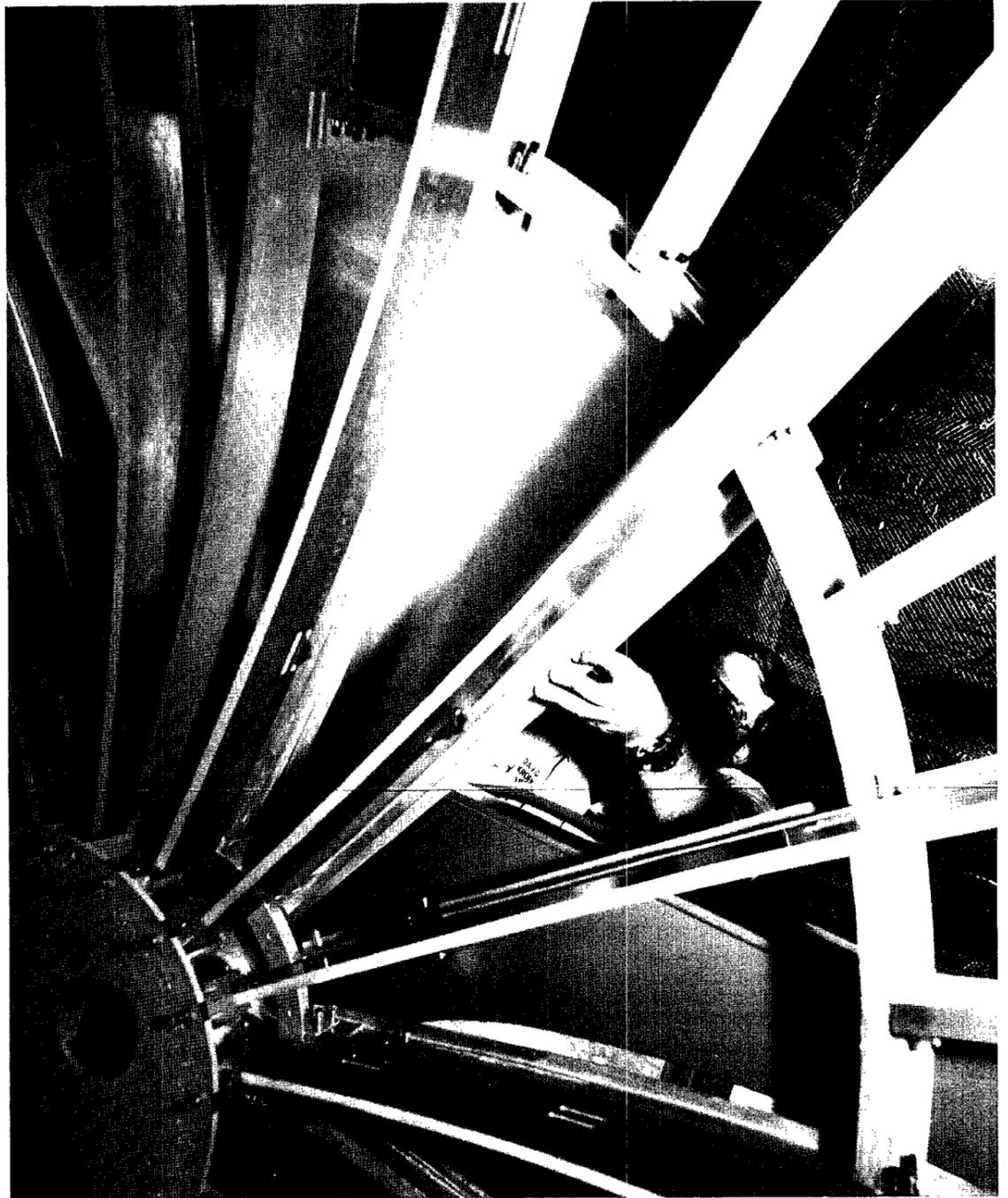
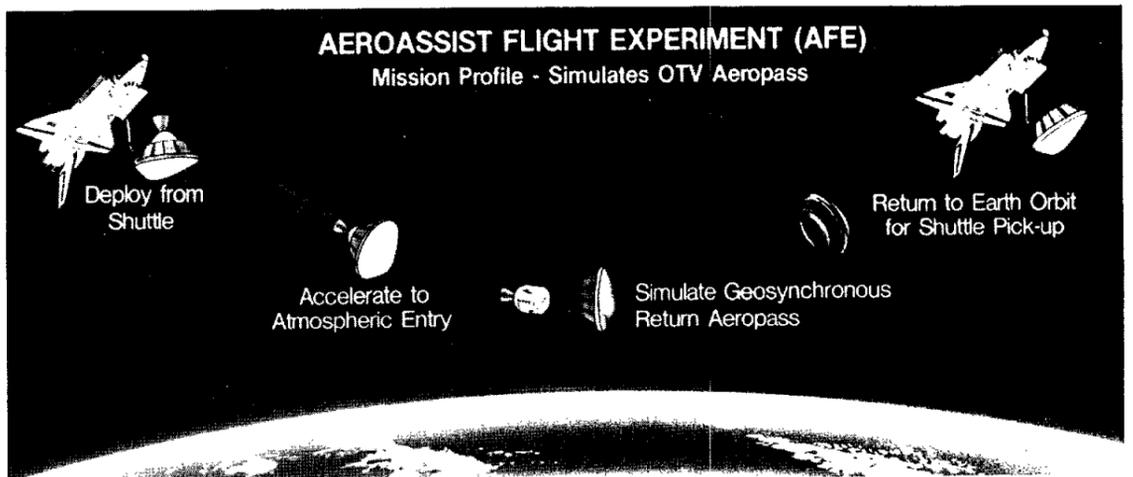
The AFE, a Marshall Space Flight Center managed project, is composed of three basic components: the aerobrake, the carrier vehicle, and the main propulsion unit.

JSC is designing and fabricating the aerobrake. About 40 JSC civil service personnel are working part time on the AFE project. A design team, formed in 1987, began creating a design, performing analytical studies, and conducting both developmental and full-scale hardware tests. Using design drawings and analysis supplied by the JSC design team, the JSC Technical Services Division has fabricated four development test models, including full scale mockups of the aerobrake.

The aerobrake will be covered with the same type of thermal tiles used by the shuttle. Additionally samples of six other thermal protection materials (two flexible materials and four tiles of differing compositions) will be tested. Experiments, avionics, data systems and propulsion components are mounted in the carrier vehicle located behind the aerobrake.

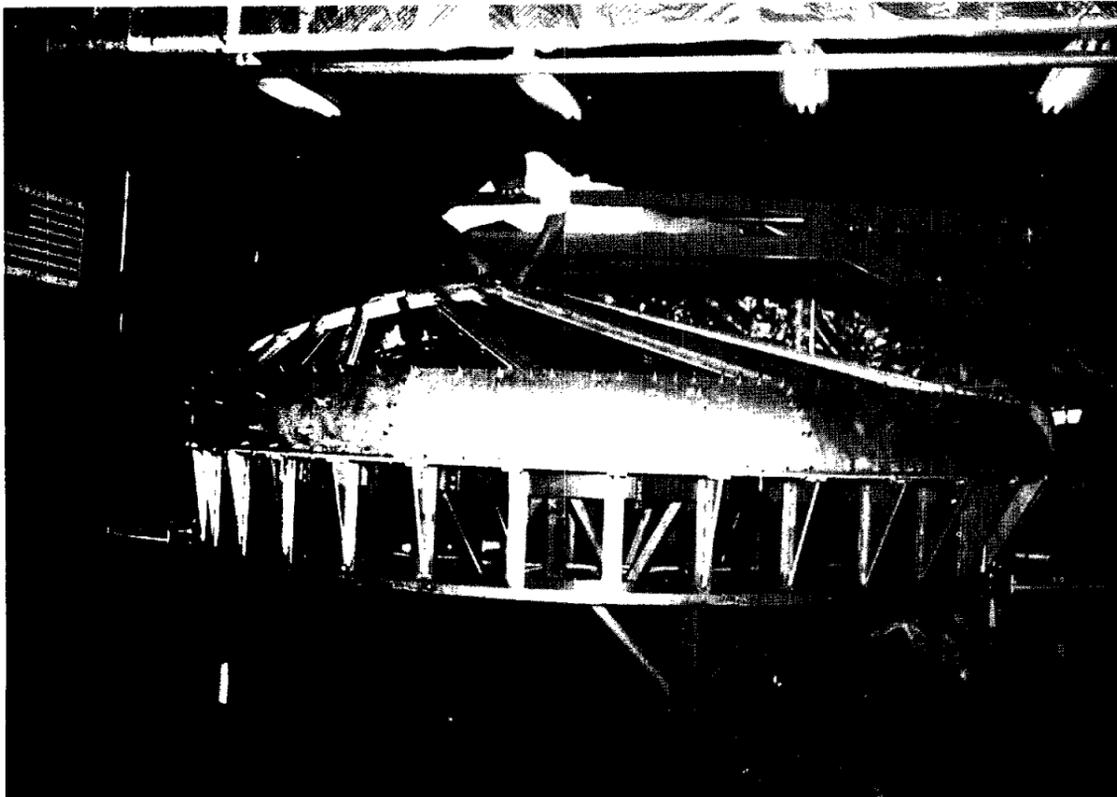
Technical Service Division personnel also have installed structural components, experimental instruments, and foam tiles fabricated by Lockheed Missiles and Space Company using JSC generated tile patterns, in the mockups.

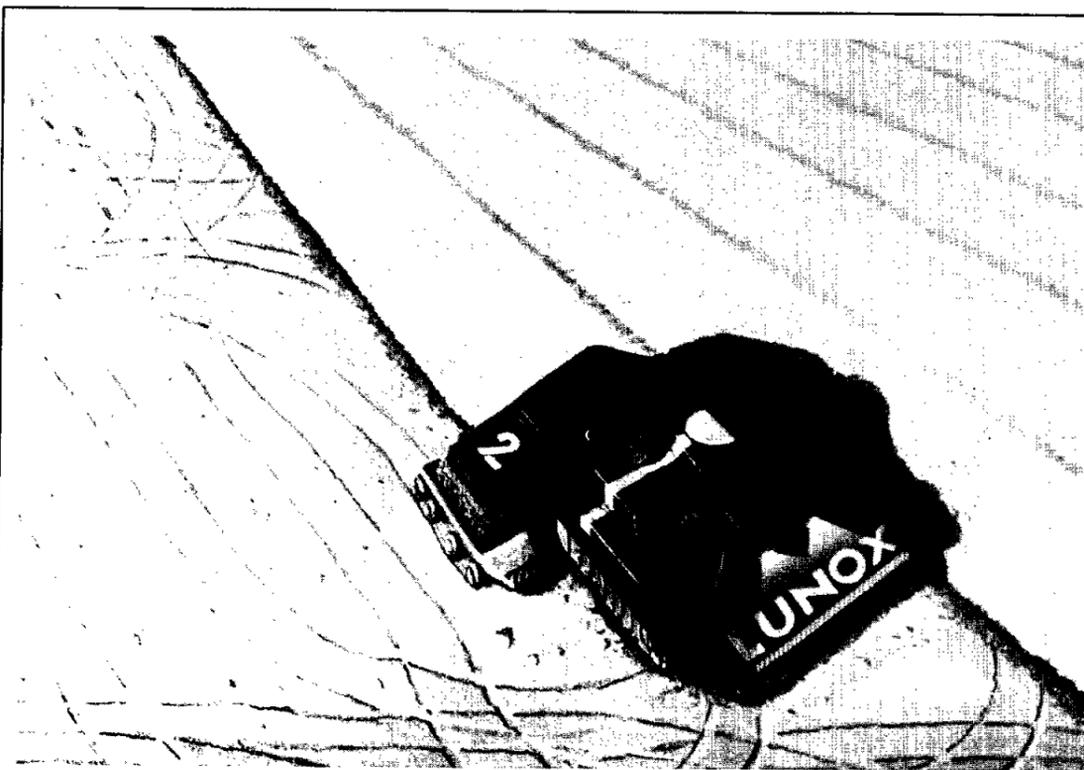
After JSC personnel install the Thermal Protection System tiles and NASA sponsored research experiments in the flight model of the aerobrake, it will be delivered to MSFC in November 1993 for final integration.



JSC Photos

Top: The Aeroassist Flight Experiment will provide a unique test of atmospheric drag and could fly in the mid-1990s. Above: JSC Technician David Kroen, of the Technical Services Division's Sheetmetal and Welding Section, attaches aluminum "stringers" which give the aerobrake structure its aerodynamic shape. Below left: Kroen works atop the assembly access platform. Below right: Kroen positions a "stringer" on the aerobrake's cone.





JSC Illustration

MOVING MACHINE—A mining vehicle scours the lunar surface extracting regolith or lunar soil. The vehicle's adjoining cycling unit would take the soil to a processing plant.

Answer to future energy needs could rest under lunar surface

In a world that is becoming increasingly more aware of its fragile environment, the search for a new, cleaner, more efficient fuel source is expanding beyond Earth's boundaries.

Researchers at the University of Wisconsin's Center for Space Automation and Robotics believe the future lies with helium-3, a rare element on Earth that might exist in large amounts on the Moon.

One ton of this "Astrofuel" could supply the electrical needs of a city of 10 million people when combined in a fusion reactor with a form of hydrogen, said experts at the Wisconsin center, one of 16 NASA Centers for the Commercial Development of Space. In fact, Apollo astronauts collected lunar samples that show the resource is so plentiful that the Earth's energy needs could be accommodated for at least 1,000 years, researchers said.

Much work must be done before helium-3-powered fusion plants become a reality. Although the university began its fusion program in 1963 and has since granted some 186 doctorate degrees in the field, no one has built a fusion reactor yet that releases more energy than it consumes. The current theory states fusion reactors operating with deuterium helium-3 are superior to fission reactors because they do not generate high-level radioactive waste.

But the unavailability of a large source of helium-3 on Earth has posed problems, said Gerald Kulcinski,

a nuclear engineering professor and technical director of the center's Astrofuel project. Once it was discovered that lunar samples contained the crucial ingredient, "people started looking at it," Kulcinski said. "It had a tremendous effect on fusion studies."

In a recent study, the center determined that lunar helium-3, which originated from the sun and was carried to the Moon by solar wind, could be mined and transported to Earth. Some early estimates place the value of helium-3 equivalent to buying oil at \$7 a barrel.

JSC is keeping abreast of the research activities surrounding helium-3, said David McKay, manager of the Mission Science and Technology Office in Solar System Exploration Division. A one-day workshop recently was held at JSC to discuss issues surrounding the technology.

Although no models have been built yet, there are many ideas for lunar mining technology. The Wisconsin center researchers designed solar-powered robotic equipment that would scoop up the top layer of lunar soil and place it into a robotic unit. The soil would be heated, thus separating the helium-3 from other lunar material. The spent material then would be dropped off the back of the moving robotic miner. Because the Moon has one-sixth the Earth's gravity, relatively little energy would be required to lift the material.

COBE takes first look at interstellar dust

NASA's Cosmic Background Explorer (COBE) has taken its first image of the entire Milky Way Galaxy in a wavelength that reveals the dust from which planets and galaxies are formed.

COBE investigators recently presented the images and their latest findings at an international workshop on cosmology at the University of Maryland, College Park. Instruments aboard the spacecraft measure cosmic background radiation, believed to be the remnant of the "Big Bang," with a precision never before achieved.

The image of the Milky Way, taken in far infrared wavelength by the Diffuse Infrared Background Experiment, shows radiation from cold interstellar dust. Last April, COBE scientists released an image taken by the same instrument in the near infrared wavelength, which revealed millions of stars in this galaxy. A comparison of these images shows the difference in the spatial distribution of the galaxy's stellar and interstellar components.

Scientists will continue to study these

data in determining the content, energetics and large scale structure of the Milky Way, as well as the nature and distribution of the dust within the Solar System.

In addition, the data will be studied for evidence of a faint, uniform infrared background, the residual radiation from the first stars and galaxies formed following the Big Bang.

COBE data taken from another instrument, the Differential Microwave Radiometer (DMR), deepen the mystery of how the early universe could have been so smooth, yet split itself into the vast structures now seen. Since last January, results accumulated from the DMR show that the early universe was very smooth; that is, no deviation has been detected in the brightness of the cosmic background radiation down to one part in 25,000.

COBE was launched November 1989 from Vandenberg Air Force Base, Calif., aboard a Delta launch vehicle. COBE is managed by the Goddard Space Flight Center for the Office of Space Science and Applications.

Health benefits Open Season starts Nov. 13

JSC employees can change their health insurance coverage during Open Season from Nov. 13-Dec. 10

To inform employees of various health insurance options, the Human Resources Office will sponsor a Health Fair from 9 a.m.-4 p.m. Nov. 16 in the Gilruth Recreation Center ballroom. Health plan representatives will participate in the fair and will have information about their plans available.

Four health plans have been discontinued and about 50 JSC employees participating in the plans have been notified that they will need to select new plans. The discontinued plans are the National Federation of Federal Employees (NFFE), the National Association of Government Employees (NAGE), Postal Supervisors, and American Federation of Government Employees (AFGE).

Two Houston-area health maintenance organizations (HMOs)-CIGNA Health Plan of Texas, Inc. and EQUICORE have merged but will

continue their coverage independently through 1991, said Mary Allen, chief of the Employee Services Section.

The official Office of Personnel Management (OPM) 1991 Enrollment Information Guide and Plan Comparison Chart will be distributed to all employees in early to mid November.

Open Season is an annual opportunity for employees to change from one health plan or option to another, move from self-only enrollment to family enrollment, or make a combination of changes. Eligible employees who previously declined health benefits coverage may elect to enroll during Open Season.

Changes and enrollments will be effective Jan. 13, 1991. Employees who will retire before Jan. 13, 1991, and are contemplating making an Open Season change should contact their retirement counselor immediately.

For more information, call the Employee Services Section at x32681.

Small business proposals catch NASA's eye

NASA recently announced the selection of 280 research proposals for immediate negotiation of Phase I contracts in NASA's 1990 Small Business Innovation Research Program.

The selected proposals were submitted by 229 small, high technology firms located in 30 states.

California had the most awards with 72, followed by Massachusetts with 47 and New York with 13. Texas, Alabama, Colorado and Maryland received about 10 each.

The SBIR program's objectives are to: stimulate technological innovation

in the United States by using small business, including minority and disadvantaged firms; help meet federal research and development needs; and encourage commercial applications of federally supported research innovations.

The awards for the eighth annual program were selected competitively from 2,148 proposals received in response to the SBIR solicitation earlier this year. Selections were made on the basis of scientific and technical merit, capabilities of the firm and value of the proposed research

innovations to NASA.

Phase I projects are six-month, fixed-price contracts, normally not exceeding \$50,000, that are designed to investigate innovative research concepts proposed by the contractor to meet agency research and development needs or opportunities described in the SBIR program solicitation.

Firms successfully completing Phase I may compete for Phase II contracts for further development. About one-half of the Phase I projects proceed into Phase II, depending on available funds. Phase II contracts do

not normally exceed two years and \$500,000 in value.

Companies in the private sector may fund Phase III activities as commercial development. NASA or other government agencies outside the SBIR program also may fund Phase III activities as procurement or continued development for government use.

As required by law, NASA allocates 1.25 percent of its annual research and development budget for SBIR. About \$14 million of NASA's 1991 SBIR budget will fund these 280 Phase I projects.

Smoke-free quest continues

(Continued from Page 1)

cigarettes since then. Those are fairly amazing statistics, if you think about it, because this certainly is no cakewalk.

All the rest may still be smoking, but most are doing so at a vastly reduced rate of consumption. I have a great deal of empathy and Christian understanding for these folks, for they are truly tumbling along in the worst kind of nicotine withdrawal freefall. Some are pounding themselves over the head for not having quit, others are struggling along at five or six or 10 cigarettes a day, telling themselves that at some indefinite, nebulous point in the very near future, they will indeed say "nevermore." Others have written it off entirely, but hey, that's their business, the little toads.

And then there is another of my classmates, who works in one of the large office buildings on-site, and shares a large bullpen area with several

smokers. You'll remember the great social restructuring that occurred when JSC's first no-smoking policy went into effect a few years ago.

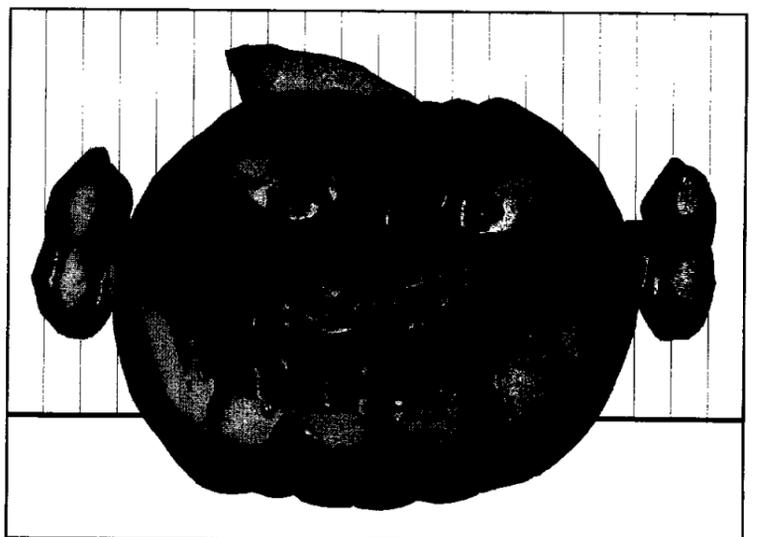
As the Center's pedestal ashtrays were gathered up and shipped off to the dustbin of history, smokers scurried for protective communal shelter, like a covey of quail, into tar-funked offices where all could savor the blessings of tobacco in the true spirit of blissful self-destruction. The non-smokers, on the other hand, somewhat less celebratory, rushed around tacking up "Thank You For Not Smoking" signs with the same grim zeal that marked the Puritans' impressive gathering of witch cinders back in good old, fun-loving Salem.

Anyway, this poor soul has now determined to quit, but there is no room for him in another, non-smoking office. His supervisor has promised a remedy by sometime in November. There have

been some words on both sides, with the smokers being, well, smokers, and the non-smokers being, well, non-smokers. Meanwhile, my classmate is hanging in there, smoking a fraction of his usual intake and still determined to quit. And there isn't the slightest chance in Hell that he will succeed unless he moves.

Will the smokers, his office mates, understand that his actions are not meant as a slap against them? Will they excuse him from the smoking brotherhood with grace? And will the non-smokers cut him some slack when he moves in with them? What happens if, perhaps, he fails on the first or the second attempt?

All I can tell you is this: he is a person with some fair degree of courage, and it would be nice if he and a lot of others like him all over the Center, now and in coming weeks, could get a break.



JSC Photo

SCAREY JACK—Halloween cast an eerie light in the office of Dr. Gene Easley, Director of Procurement with a jack-o-lantern, Texas style. STSOC Contracting Officer Virginia Willis created the fiercesome face.